

thrift, since they cannot yet count up quite two millions of pounds; and that of Johns Hopkins, briefer but also great, has been achieved with an endowment of little above one million. The Carnegie Institute at Washington has two millions. Many of the other institutions of higher learning are far less adequately provided for; but in general it may be said that the Republic is more liberal with its schools than with anything else. In no other field do its private citizens display more generosity, and as for public expenditure, to give but one illustration, it may be mentioned that the single State of New York spent in 1905 from the public treasuries, State and local, for its schools in the neighbourhood of nine million pounds.

## SOCIETIES AND ACADEMIES.

### LONDON.

**Royal Society**, December 7, 1905.—“On the Influence of Bias and of Personal Equation in Statistics of Ill-defined Qualities: an Experimental Study.” By G. Udny Yule. Communicated by Prof. O. Henrici, F.R.S.

To attempt to answer the question raised by the results of the preceding investigation an experiment was conducted, by asking observers to classify under such headings as “light,” “medium,” “dark,” scraps of photographic paper printed to different depths of colour. The results show that (1) personal equation in the use of such terms is very large indeed; (2) the majority of observers tend to return an excess of pairs of tints of the same name; (3) the amount of this excess is increased when different observers' results are pooled, owing to their varying personal equations; (4) but it is markedly less than the excess of the number of homonymous pairs (as compared with a normal distribution) in several of the tables for inheritance of qualities. The answer to the question remains therefore somewhat indefinite, and further investigation is required.

**Chemical Society**, March 15.—Prof. R. Meldola, F.R.S., president, in the chair.—The interaction of well-dried mixtures of hydrocarbons and oxygen: W. A. Bone and G. W. Andrew. The results of experiments carried out chiefly with well-dried mixtures of ethylene and oxygen indicate that steam is not essential to the combustion of hydrocarbons.—The explosive combustion of hydrocarbons: W. A. Bone and J. Drugman. The results of this research indicate that there is no essential difference between the slow and rapid combustion of a hydrocarbon, and that explosive combustion probably involves the initial formation of unstable hydroxylated molecules, which subsequently undergo thermal decomposition into simpler products.—The occurrence of methane among the decomposition products of certain nitrogenous bases as a source of error in the estimation of nitrogen by the absolute method: P. Haas. The author confirms and extends to a large number of substances Dunstan and Carr's observation that in the Dumas method of determining nitrogen in organic substances an error may be caused by the inclusion of marsh gas in the gas collected and measured.—Studies on comparative cryoscopy, part iv., the hydrocarbons and their halogen derivatives in phenol solution: P. W. Robertson.—The displacement of acid ions, part i.: A. F. Joseph. The author describes his investigations on the quantitative action of hydrochloric acid on the nitrates of potassium, sodium, and strontium, and of nitric acid on the corresponding chlorides.—Additive compounds of arylamines with aromatic nitro-derivatives: C. L. Jackson and L. Clarke. 4:6-Dibromo-1:3-dinitrobenzene dimethylaniline, 4-chloro-1:3:5-tribromo-2:6-dinitrobenzene dimethylaniline and other similar additive products are described.—Influence of substituents in the trinitrobenzene molecule on the formation of additive compounds with arylamines: J. J. Sudborough and N. Picton. The formation of additive compounds between  $\alpha$ - or  $\beta$ -naphthylamine and *s*-trinitrobenzene derivatives is completely inhibited by the introduction of three methyl-, two methoxy-, or three bromo-radicals into the trinitrobenzene molecule.—The relations between absorption spectra and chemical constitution, part iv., the re-activity of the substituted quinones: A. W. Stewart and E. C. C. Baly. An examination was made of the

absorption spectra of various quinones, and conclusions are drawn as to the conditions in which these substances exist.—The constitution and properties of acyl thiocyanates: J. Hawthorne.—A mode of formation of aconitic and citrazinic acids and their alkyl derivatives, with remarks on the constitution of aconitic acid: H. Rogerson and J. F. Thorpe.—Aromatic sulphonium bases: S. Smiles and R. Le Rossignol. Two methods of preparing aromatic sulphonium bases are described, (1) from a sulphoxide and phenetole with a dehydrating agent, (2) from a sulphinic acid and phenetole with strong sulphuric acid.—A new form of calcium chloride tube for combustion: A. E. Hill. This tube is described and illustrated in the current number of the Proceedings of the Chemical Society, 1906, xxii., 87.—The viscosity of liquid mixtures, part iii.: A. E. Dunstan.—The action of phenylpropionyl chloride on the ketonic compounds, part ii.: S. Ruhemann.

### PARIS.

**Academy of Sciences**, March 26.—M. H. Poincaré in the chair.—The methods used in the search for luminous particles mixed with the gas of the chromosphere and the solar protuberances. Application during the eclipse of 1905: H. Deslandres. The lines due to the gases are readily observed, but the continuous spectrum due to the presence of liquid or solid particles is much more difficult to recognise. The author attacked this problem during the last eclipse, making use of coloured screens to remove the gaseous radiations. A preliminary account of the results is given.—Observations on Gennadas: E. L. Bouvier. The author draws the following conclusions from his work in this and a preceding paper on the same subject: the Gennadas are clearly bathypelagic, and do not descend to live at great depths; they do not rise to the surface for reproduction, and are derived from Benthescymus by adaptation to a bathypelagic existence.—Quasi-waves of shock in the midst of a fluid which is a good conductor of heat: P. Duhem.—The Oligocene basin of Ebro and the Tertiary history of Spain: Ch. Depéret and L. Vidal.—The total eclipse of the sun of August 30, 1905; solar protuberances of two colours: J. Esquirol.—A magic square: G. Tarry.—The theory of characteristics: E. Goursat.—Discontinuous ensembles: L. Zoretti.—The development of non-integrable functions in trigonometrical series: P. Fatou.—Hyperelliptic surfaces defined by intermediate singular functions: Louis Remy.—The deformation of the metals of a railway: G. Cuénot.—A mode of construction of aéroplanes allowing of an increase, in notable proportions, of their sustaining power: E. Seux.—The evaluation of the power of microscopic objectives: L. Malassez.—The variations of the absorption bands of a crystal in a magnetic field: Jean Becquerel. The spectrum of xenotime, a uniaxial crystal giving fine absorption bands, was obtained with a Rowland grating, and the effect of placing the crystal in a magnetic field examined. The resulting displacement of some of the bands was much greater than would be expected from the magnitude of the ordinary Zeeman effect in metallic vapours.—Gaseous osmosis through a colloidal membrane: Jules Amar. A perfectly dry colloidal membrane is impermeable to carbon dioxide; the gas diffuses through only when the membrane is moist, and the amount diffused diminishes progressively as the membrane dries.—A contribution to the study of the intermittent discharge: G. Millochau.—New researches on bulbs producing X-rays: M. Nogier.—The use of the Cooper-Hewitt lamp as a source of monochromatic light: Ch. Fabry and H. Buisson. This mercury arc lamp, which is now made commercially, gives a light of uniform intrinsic lustre. The yellow and green rays are so fine as to give interference phenomena with a difference of path of 22 cm., that is to say, of an order of about 490,000. The yellow rays give particularly fine results.—The isolation and some atomic characters of dysprosium: G. Urbain. The author has isolated 50 grams of an earth the spectral characters and atomic weight of which show such constancy among the different fractions that it is impossible to imagine that it is a mixture. Details of the methods of separation used and the spectrum observed are given.—The commercial preparation of calcium hydride: Georges F. Jaubert. The product, as put on the

market, contains about 90 per cent. of calcium hydride, the remainder consisting chiefly of oxide and nitride. One kilogram of this, when acted on by water, gives about a cubic metre of pure hydrogen. The lifting power of this being about 1200 grams, calcium hydride has been already used in aeronautics.—The action of the xanthic leucomaines on copper: N. **Slomnesco**.—A new type of equilibrium reaction: L. J. **Simon**. The equilibrium studied was the reaction between urethane and pyruvic acid.—Practical details in the estimation of cadmium: H. **Baubigny**.—The estimation of the albumenoid material in milk: MM. **Trillat** and **Sauton**. The method is based upon the property of formaldehyde of rendering the milk albumenoids insoluble without affecting their weight. The working method is given, and also control analyses.—The catalytic action exercised by alkaline and alkaline-earth salts in the fixation of atmospheric oxygen by solutions of polyphenols: E. **Fouard**.—The formation and distribution of the terpene compounds in the bitter orange: Eug. **Charabot** and G. **Laloue**.—A parasite of the pearl oyster determining the production of fine pearls at the Gambier Islands: L. G. **Seurat**. The parasite is named *Tylocephalum margaritiferae*, and, owing to its pearl-forming properties, is of considerable economic importance.—The origin of the nerves: N. A. **Barbieri**.—Hæmatogen and the formation of hæmoglobin: L. **Hugounenq** and Albert **Morel**.—Aseptic hyperthermia due to operations: MM. **Charrin** and **Jardry**.—A contribution to the history of the Piedmont geosynclinal: Émile **Argand**.—A contribution to the physical geography of the Atlas chain of Morocco: Louis **Gentil**.

## DIARY OF SOCIETIES.

### THURSDAY, APRIL 5.

- ROYAL SOCIETY, at 4.30.—On Retardation of the Discharge of an Electro-scope by Means of certain Radio-active and other Substances: Dr. W. S. Lazarus-Barlow.—On a Mineral, which retards the Rate of Discharge of an Electro-scope: Dr. E. H. Büchner.—On a New Method of obtaining Continuous Currents from a Magnetic Detector of the Self-Restoring Type: L. H. Walter.—On the Distribution of Radium in the Earth's Crust, and on the Earth's Internal Heat: Hon. R. J. Strutt, F.R.S.—On the Physiological Action of a recently discovered African Arrow Poison: Dr. C. Bolton.
- CHEMICAL SOCIETY, at 8.30.—An Improved Apparatus for measuring Magnetic Rotations and obtaining a Powerful Sodium Light: W. H. Perkin, Sen.—The Rusting of Iron: G. T. Moody.—On the Determination of Carbon in Soils: A. D. Hall, N. H. J. Miller and N. Harmer.—The Electrolysis of the Salts of  $\beta\beta$ -Dimethylglutaric Acid: J. Walker and J. K. Wood.—Bromo- and Hydroxy-derivatives of  $\beta\beta\beta\beta'$ -Tetramethylsuccinic Acid: J. K. Wood.—Some new Orthoxylene Derivatives: G. Stallard.—A new Solvent for Gold. Preliminary Note: J. Moir.—The Molecular Condition in Solution of Ferrous Oxalate: a Correction: S. E. Sheppard and C. E. K. Mees.
- ROYAL INSTITUTION, at 5.—Internal Combustion Engines: Prof. B. Hopkinson.
- INSTITUTION OF ELECTRICAL ENGINEERS, at 8.—Electrical Equipment of the Aberdeen Collieries of the Powell Duffryn Company: C. P. Sparks.—Electric Winding considered Practically and Commercially: W. C. Mountain (*Conclusion of Discussion*).
- LINNEAN SOCIETY, at 8.—*Exhibition*: Some Plants new to the pre-Glacial Flora of Great Britain: Clement Reid, F.R.S.—*Papers*: A Second Contribution to the Flora of Africa.—Rubiaceæ and Compositæ, Part II.: Spencer Moore.—The Anatomy of the Stem and Leaf of *Nuytsia floribunda*, R.Br.: E. J. Schwartz.—Taiwanites, a new Genus of Conifera from the Island of Formosa: B. Hayata.
- CIVIL AND MECHANICAL ENGINEERS' SOCIETY, at 8.—Steam Turbines: G. D'A. Meynell.

### FRIDAY, APRIL 6.

- MALACOLOGICAL SOCIETY, at 8.—On a Species of the Land Molluscan Genus *Dyakia* from Siam: Lt.-Col. H. H. Godwin-Austen, F.R.S.—Descriptions of new Species of Land Shells from Peru and Colombia: S. I. Da Costa.—Note on Swainson's Genus *Volutilithes*: R. Bullen Newton.—Further Notes on the Genus *Chloritis*, with Description of new Species: G. K. Gude.—*Vertigo parcedentata*, Braun, in Holocene Deposits in Great Britain: A. S. Kennard and B. B. Woodward.
- ROYAL INSTITUTION, at 9.—The Physical Basis of Life: W. B. Hardy, F.R.S.
- GEOLOGISTS' ASSOCIATION, at 8.—The Pressure-chipping of Flint, and the Question of Eolithic Man: S. H. Warren.

### SATURDAY, APRIL 7.

- ROYAL INSTITUTION, at 3.—The Corpuscular Theory of Matter: Prof. J. J. Thomson, F.R.S.
- THE ESSEX FIELD CLUB (at Essex Museum of Natural History, Stratford), at 6.30.—Salt-making in Essex, Ancient and Modern: Miller Christy.—Neolithic Man in Epping Forest: F. W. and H. Campion.

### MONDAY, APRIL 9.

- ROYAL GEOGRAPHICAL SOCIETY, at 8.30.—Presentation by H.E. the American Ambassador of the Gold Medal of the American Geographical Society to Captain R. F. Scott, Commander of the National Antarctic

Expedition.—*Paper*: Recent Exploration and Survey in Seistan: Col. Sir Henry McMahon, K.C.S.I.

VICTORIA INSTITUTE, at 4.30.—The Bible in the Light of Modern Science: W. Woods Smyth.

### TUESDAY, APRIL 10.

- ZOOLOGICAL SOCIETY, at 8.30.—The Freshwater Fishes of the Island of Trinidad, based on the Collection, and Notes and Sketches, made by Mr. Lechmere Guppy, Jun.: C. Tate Regan.—The Marine Fauna of Zanzibar and British East Africa from Collections made by Cyril Crossland in the Years 1901-2. Alcyonaria: Prof. J. Arthur Thomson and W. D. Henderson.—(1) Cyclopoida in Osseous Fishes; (2) Notes on Supernumerary Eyes, Local Deficiency and Reduplication of the Notochord in Trout Embryos: Dr. J. F. Gemmill.
- INSTITUTION OF CIVIL ENGINEERS, at 8.—On the Resistance of Iron and Steel to Reversals of Direct Stress: Dr. T. E. Stanton and L. Bairstow.
- FARADAY SOCIETY, at 8.—Note on the Rotating Electric Steel Furnace in the Artillery Construction Works, Turin: E. Stassano.—Electrothermics of Iron and Steel: C. A. Keller.—Recent Developments in the Gin Electric Steel Furnace: G. Gin.—Note on the Cleaning of Work by Means of the Electric Current: H. S. Coleman.

### WEDNESDAY, APRIL 11.

ROYAL ASTRONOMICAL SOCIETY, at 5.

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